

A. E. Humber, Portsmouth; G. Lees, Southsea; A. Ward, London; A. W. Sawyer, London; C. E. G. House, Chatham; H. Schofield, Halifax; J. M. Robertson, Pembroke Dock; W. E. G. Sillick, Devonport; J. A. Cormack, Glasgow; F. Clements, Chesterfield; B. J. Cole, Devonport; P. W. M. Sparey, London; S. Lees, Manchester; B. H. Penn, Bedford; W. H. Stock, Swindon; W. R. Sinclair, Newcastle-on-Tyne; M. Bell, Bensham, Gateshead; T. H. Essery, Devonport; S. H. Warren, Devonport; A. R. Valon, London; G. R. Wilkinson, Oldham; A. D. Johnston, jun., South Shields; W. C. A. Bowles, London; A. L. Bird, Cambridge; T. N. Adlam, Trowbridge; J. Bedford, Chingford; P. P. Smart, Wolverton; C. L. Gransden, Chatham; W. F. Brown, Birkenhead.

THE following list of successful candidates in this year's competition among science students for Royal exhibitions, national scholarships and free studentships has been issued by the Board of Education:—*Royal exhibitions*: Arthur B. Middleton, Bradford, Manchester; William White, Southsea; Alfred E. Humber, Portsmouth; George Lees, Southsea; Frederick E. Pollard, Eastwood, Notts; James L. Kent, Portsmouth; Frank Fielden, Halifax. *National Scholarships for Mechanics (Group A)*: Arthur T. Wall, Plymouth; Arthur Cannon, Plymouth; William E. Donmett, Southsea; Herbert J. London, London; Charles E. G. House, Chatham; William E. G. Sillick, Devonport. *Free Studentships for Mechanics (Group A)*: Charles L. Gransden, Chatham; Harford G. Stephens, Leicester. *National Scholarships for Physics (Group B)*: John M. Strang, Glasgow; Frederick Reid, Glasgow; John W. Waters, Chatham; Dudley Orson-Wood, Chiswick; George F. Hemens, London; William F. Higgins, London; Walter C. M. Pettingill, Leeds. *Free Studentships for Physics (Group B)*: Frederick J. Harlow, Whitstable; Edward F. Pattenden, Whitstable. *National Scholarships for Chemistry (Group C)*: Harry F. V. Little, London; Tom Thornley, Blackburn; Samuel Lamb, Bradley, Bilston; Alan C. Webber, Brighton; John H. Jennings, Plymouth; Robert O'F. Oakley, London. *Free Studentships for Chemistry (Group C)*: Archibald Wise, Plymouth; Charles S. Garland, London. *National Scholarships for Geology (Group E)*: John W. Maxfield, Burnley; Ernest Proctor, Burnley; James Mitchell, Burnley.

THE annual general meeting of the Association of Teachers in Technical Institutes was held at the Birkbeck College, London, on November 4. The association, which was founded a year ago, already has a membership of 300 exclusive of the Association of Teachers of Domestic Sciences, which is affiliated with it. Mr. W. J. Lineham, the president, was in the chair, and moved the adoption of the report of the council, which was subsequently agreed to. The council recommends in the report that meetings of teachers in provincial technical institutes be called to lay the claims of the association before them directly. A resolution was passed instructing the council to call meetings of the teachers in provincial technical institutes and to consider the following matters with full powers to act therein:—(a) The formation of local or provincial branches of the association; (b) joint action or federation with the West Riding Association of Teachers of Science, Art, and Technology, the Federation of London Teachers, and other bodies of teachers. One of the most important matters discussed during the year has been the registration of teachers. A scheme has been drawn up by the council, and a circular has been issued to members pointing out its importance upon the future status and professional position of teachers in technical institutes. A scheme for registration has already been formulated by the teachers of domestic science. The council recommends that steps be taken at an early date, by deputation or otherwise, to urge upon public examining authorities the importance of securing closer connection between the examiner and the teacher. Various amendments to the constitution and rules were decided upon, and the title of the association was changed to that of "The National Association of Teachers in Technical Institutes," and it was resolved that its officers be a president, two vice-presidents, an hon. secretary, and an hon. treasurer. Mr. Lineham was elected president for the ensuing year.

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SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, October 27.—Prof. J. H. Poynting, F.R.S., president, in the chair.—The theory of phase-meters: Dr. W. E. Sumpner. The author shows in the paper that the theory of the instruments is the same whether they contain iron or not, and however the coils may be arranged; that they can be calibrated by direct-current methods, although for use on alternating-current circuits; and that a new type of instrument, containing iron, conforms to the theory given. The main results of the investigation are:—(1) Phase-meters for multi-phase circuits are all equally accurate on balanced loads provided they have been correctly calibrated and possess no faults due to purely mechanical causes. Their accuracy is not affected by variations in wave-form or in current-frequency. (2) Phase-meters can be simply and accurately calibrated for balanced loads by means of a direct-current method of test. (3) The error of phase-meters on unbalanced circuits is generally serious for loads which are badly out of balance. The error, like that of a wattmeter, increases rapidly as the power-factor of the load diminishes. It can only be reduced at the expense of complication in the instrument, by increasing the number of coils used in the fixed and moving systems, and by arranging the coils and magnetic circuits to be symmetrical in regard to one another.—Apparatus designed for measuring the coronal radiation during an eclipse: Prof. H. L. Callendar. A preliminary test of the apparatus with the thermopile directly exposed to radiation of known intensity showed a deflection of nearly 25 cm. for one-thousandth of a calorie per sq. cm. per min., so that radiation one-millionth of full sunshine could be detected with certainty without using a mirror. When placed in the focus of the telescope used, radiation one thousand times smaller than this could be observed, so that even if the intrinsic heat-radiating power of the corona were only one ten-millionth of the solar surface it could still be measured to within 1 per cent. The essential point in the observations was to eliminate the variable effects of atmospheric radiation, for which a differential method of observation with the two halves of the pile was particularly suitable. In taking observations on the corona, the motion of the moon during totality was made use of to define the exact area of the corona corresponding to the differential reading. At the commencement of totality, the thermopile being centred on the sun, the inner corona on the eastern limb would be fully exposed, while on the western it would be partly covered by the moon. At the end of totality the reverse would be the case. The difference of the readings would correspond to the radiation of the strip of the inner corona uncovered by the motion of the moon between the two readings. The area of the strip of corona considered could be accurately determined from the times at which the readings were taken.

PARIS.

Academy of Sciences, October 30.—M. Troost in the chair.—Two hæmatozoa of the partridge and turkey: A. Laveran and M. Lucet. The first of these was the cause of the death of 97 out of 100 Hungarian partridges imported into France. Its appearance and mode of division corresponded with *Haemamoeba relictæ*, a parasite which has been known to be responsible for epidemics in many birds, but not hitherto of the partridge. The other parasite, found to be the cause of perityphlo-hepatitis in the domestic turkey, appears to belong to a new species, and is named *Haemamoeba Smithi*.—A criterion for the application of the Gompertz-Makeham mortality law: Charles Goldziher. The application of this law depends absolutely on the regularity of the original series, but, so far, an exact criterion for the exactitude of the limits between which this application is possible has been wanting. This is worked out in the present paper.—On the composition of the hydrochloroferric colloid with respect to the amount of hydrochloric acid present in the suspending liquid: G. Malfitano. By increasing the concentration of the medium in hydrochloric acid, the colloid tends to approximate to the composition $H(Fe_2O_3H)_2Cl$.—Observations relating to some india-rubber plants: A. Chevalier. Whatever may be the family to which a caoutchouc belongs, its richness

in india-rubber is an individual peculiarity. The yield may be very different in two individuals of the same age and of the same size, living side by side, and having the latex extracted at the same time.—The influence of different kinds of light radiations on the migration of the albumenoids in the wheat grain: J. Dumont. It was found that the radiations which have the greatest effect on the migration of the albumenoids in the wheat grain are precisely those which act the least on the chlorophyll function.—On the mechanical work furnished by windmills: M. Ringelmann. The windmill studied was of the type used in agriculture for raising water. Automatic records were made of the velocity of the wind, the number of turns of the vane, and of the water lifted. A table of results for different velocities of the wind is given, and from this the work obtainable from a windmill can be calculated.—The accessory glands to the silk-producing apparatus of the larvæ of *Io Irene*: L. Bordas. The liquid or slightly viscous substance secreted by the accessory glands serves to agglutinate or unite the two silk threads. It is possible, also, that it exerts a chemical action on the threads, causing them to harden rapidly.—On the existence of strata containing Clymenia in the central plateau, Morvan: Albert Michel-Lévy.—On the dissymmetry of the loss of electricity in mountainous countries: the comparative rôles of height and relief: MM. Bernard Brunhes and Albert Baldit. At the summit of a mountain the rate of loss of volts is greater for negative than for positive electricity. These results serve to show why several authors have been led to think that passing from the plain to a mountain leads to a great exaggeration of the loss of negative electricity.

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 9.

MATHEMATICAL SOCIETY, at 5.30.—Annual General Meeting.—The Continuum and the Second Number-class: G. H. Hardy.—On the Arithmetical Nature of the Coefficients in a Group of Linear Substitutions of Finite Order (second paper): Prof. W. Burnside.—On the Asymptotic Value of a Type of Finite Series: J. W. Nicholson.—On an Extension of Dirichlet's Integral: Prof. T. J. I. A. Bromwich.—(1) On Improper Multiple Integrals; (2) On the Arithmetic Continuum: Dr. E. W. Hobson.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Inaugural Address: John Gavey, C.B.

FRIDAY, NOVEMBER 10.

ROYAL ASTRONOMICAL SOCIETY, at 5.—(1) Observations of the Satellite of Neptune from Photographs taken between Nov. 11, 1904, and April 15, 1905; (2) Micrometric Measures of Double Stars made with the 28-inch Refractor in the Year 1904: Royal Observatory, Greenwich: Communicated by the Astronomer-Royal.—(1) On the Secular Acceleration of the Earth's Orbital Motion; (2) On the Ptolemaic Eclipses of the Moon recorded in the Almagest: P. H. Cowell.—Observations of Phenomena of Jupiter's Satellites made at Windsor, New South Wales, in the Years 1900 and 1902: John Tebbutt.—On the Corrections to Hansen's "Tables de la Lune," as deduced by Mr. Cowell: E. Nevill.

PHYSICAL SOCIETY, at 8.—The Question of Temperature and Efficiency of Thermal Radiation: J. Swinburne.—Note on Constant-Deviation Prisms: T. H. Blakesley.

MALACOLOGICAL SOCIETY, at 8.—(1) Descriptions of New Species of Drymæus, Amphicyclotus, and Neocyclus from Central and South America; (2) Description of a New Species of Achatina from Mashonaland: S. I. Da Costa.—On a Collection of Land and Freshwater Shells from Sumatra with Descriptions of New Species, part i.: Rev. R. Ashington Bullen.—On a New Species of Oliva: F. G. Bridgman.—On the Anatomy of *Ensis macha* and *Solen fonesii* and *S. viridis*: H. H. Bloomer.

TUESDAY, NOVEMBER 14.

INSTITUTION OF CIVIL ENGINEERS, at 8.—On Waterways in Great Britain: J. A. Saner.

ZOOLOGICAL SOCIETY, at 8.30.—On the Papillary Ridges in Mammals, chiefly Primates: Dr. Walter Kidd.—On a Collection of Mammals brought home by the Tibet Frontier Commission: J. Lewis Bonhôte.—Note on the Geographical Distribution of the Okapi: Dr. Einar Lönnberg.—Notes on Goral found in Burma: Major George H. Evans.—The Mammals of Crete: Dorothea M. A. Bate.

MINERALOGICAL SOCIETY, at 8.—The Determination of the Angle between the Optic Axes of a Crystal in Parallel Polarised Light: Dr. J. W. Evans.—(1) On a Tabular Crystal of White Diopside; (2) On a Carlsbad twin of Albite: Prof. W. J. Lewis.—Note on the Crystallisation of Drops, especially of Potash-Alum: J. Chevalier.—Note on the Formation of Gypsum Crystals in a Disused Well at Chemical Works: C. J. Woodward.—(1) Ilmenite from the Kollergraben, Binnenthal; (2) On a New Red Cubic Mineral; (3) On Seligmannite, Marriite, and Lengenbachite from the Lengenbach Quarry; (4) On Anhydrite and other Minerals found in the White Dolomite of the Simplon Tunnel: R. H. Solly.

WEDNESDAY, NOVEMBER 15.

SOCIETY OF ARTS, at 8.—Opening Address of the Chairman of the Council, Sir Owen Roberts.

ENTOMOLOGICAL SOCIETY, at 8.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—The Rainstorm of August

24-26, 1905, in Co. Dublin and Co. Wicklow: Sir J. W. Moore.—The Aquameter: Dr. W. B. Newton.

ROYAL MICROSCOPICAL SOCIETY, at 8.—Exhibition of Microscope Slides of Tsetse-Fly Dissections, Trypanosomes, etc.

THURSDAY, NOVEMBER 16.

ROYAL SOCIETY, at 4.30.—The Physical and Chemical Properties of Iron Carbonyl: Sir James Dewar, F.R.S., and H. O. Jones.—The Transit of Ions in the Electric Arc: A. A. Campbell Swinton.—First Photographs of the Canals of Mars: Prof. Percival Lowell.—On the Laws of Radiation: J. H. Jeans.—The Pressure of Explosions. Experiments on Solid and Gaseous Explosives: J. E. Petavel.—On Newton's Rings formed by Metallic Reflection: Prof. R. C. Maclaurin.—The Accurate Measurement of Ionic Velocities: Dr. R. B. Denison and Dr. B. D. Steele.

CHEMICAL SOCIETY, at 8.30.—Silicon Researches, Part ix., Bromination of Silicophenyl Imide and Amide, and Formation of a Compound including (SiN): J. E. Reynolds.—Condensation of Ketones with Mercury Cyanide: J. E. Marsh and R. de J. F. Struthers.—Application of the Microscopic Method of Molecular Weight Determination to High Boiling Solvents: G. Barger and A. J. Ewins.—Green Compounds of Cobalt produced by Oxidising Agents: R. G. Durrant.—Synthesis of Tertiary Menthol and of Inactive Menthene: W. H. Perkin, Jun.—Optically Active Reduced Naphthoic Acids, Part i., Dextro- Δ^2 or Δ^3 -dihydro-naphthoic Acid: R. H. Pickard and A. Neville.

LINNEAN SOCIETY, at 8.—Contributions to the Embryology of the Ametiferæ: Dr. Margaret Benson, Elizabeth Sanday and Emily Berridge.—On the Ears of certain Sharks: Prof. Chas. Stewart, F.R.S.

FRIDAY, NOVEMBER 17.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Seventh Report of the Alloys Research Committee; On the Properties of a Series of Iron-Nickel-Manganese-Carbon Alloys: Dr. H. C. H. Carpenter, R. A. Hadfield, and P. Longmuir.

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